Adarsh Kumbhari

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EDUCATION

PhD, Applied Mathematics School of Mathematics and Statistics, University of Sydney, 2021
Title: *Mathematical models of cellular dysfunction.*

BSc (AdvMaths) (Hons I, 92/100) School of Mathematics and Statistics, University of Sydney, 2017
Title: *Can cellular crowding limit the effectiveness of cancer vaccines? A mathematical model.*

RESEARCH EXPERIENCE

2019 **Intern,** Department of Immuno-Oncology, Beckman Research Institute, City of Hope, CA, USA.

2018 **Participant (Integrated Mathematical Oncology Workshop),** Department of Integrated Mathematical Oncology, H. Lee Moffitt Cancer Center & Research Institute, FL, USA.

AWARDS AND FUNDING

2019 Sydney Cancer Research Network Travel Grant ($2,000 AUD)
2019 Philipp Hofflin International Research Travel Scholarship ($7,000 AUD)
2019 Society for Mathematical Biology Landahl-Busenberg Travel Grant ($500 USD)
2018 Postgraduate Research Support Scheme ($2,500 AUD)
2017 Postgraduate Research Support Scheme ($3,000 AUD)
2017 Society for Mathematical Biology Landahl-Busenberg Travel Grant ($700 USD)
2017 University of Sydney Merit Award ($5,000 AUD p.a., $15,000 AUD total)
2017 Australian Government Research Training Program Scholarship ($27,000 AUD p.a., $81,000 AUD total)
2017 KE Bullen Memorial Prize (Proficiency in Applied Maths) ($1,000 AUD)
2016 George Allen Scholarship in Applied Mathematics ($1,000 AUD)

PUBLICATIONS

Refereed Journal Articles

Kumbhari, A., Rose, D., Lee, P.P., & Kim, P.S. (2021). A minimal model of T cell avidity may identify subtherapeutic vaccine schedules. *Mathematical Biosciences*, doi: 10.1016/j.mbs.2021.108556.

Kumbhari, A.*, Egelston, C.A.*, Lee, P.P., & Kim, P.S. (2020). Mature dendritic cells may promote high avidity tuning of vaccine T cell response. *Frontiers in Immunology*, doi: 10.3389/fimmu.2020.584680. (*Co-first authorship.)

Kumbhari, A., Kim, P. S., & Lee, P. P. (2020). Optimisation of anti-cancer peptide vaccines to preferentially elicit high-avidity T cells. *Journal of Theoretical Biology*, doi: 10.1016/j.jtbi.2019.110067.

Manuscripts in Submission

Kumbhari, A., Ghosh, S., Kim, P.S., & Rajagopal, V. (2020). An in-silico study to determine whether changes to mitochondria organization through engineered mitochondrial dynamics can enhance bioenergetics in cardiomyocytes. *BioRxiv*, doi: 10.1101/2020.09.21.307306.

Manuscripts in Preparation (available by request)

Kumbhari, A.*, Egelston, C.A.*, Avalos, C., Lee, P.P., & Kim, P.S. Regulation of macrophage PD-L1 expression may explain its poor prognostic value as a biomarker (*Equal contribution.)

INVITED TALKS

2021   "Regulation of PD-L1 inside the tumour microenvironment",
       U.S. National Institute of Standards and Technology

2018   "The importance of mitochondrial fission and fusion in a beating heart cell",
       U.S. National Institute of Standards and Technology

PRESENTATIONS AT CONFERENCES

2021   57th Australian and New Zealand Industrial and Applied Mathematics
       (ANZIAM) Conference (Virtual conference)
2020   56th Australian and New Zealand Industrial and Applied Mathematics
       (ANZIAM) Conference, Hunter Valley, Australia
2019   University of Wollongong's 5th Mathematical Modelling in Biology and
       Medicine Workshop, NSW, Australia
2019   63rd Annual Meeting of the Australian Mathematical Society, VIC, Australia
2019   Society for Mathematical Biology Annual Meeting, Montreal, Canada
2019   55th ANZIAM Conference, Nelson, New Zealand

2018   Society for Mathematical Biology Annual Meeting, NSW, Australia
2018   54th ANZIAM Conference, Tasmania, Australia
2018   CMM-Fields-INRIA Workshop on Mathematics for Medicine, Ontario, Canada
2017   61st Annual Meeting of the Australian Mathematical Society, NSW, Australia
2017   University of Wollongong's 3rd Mathematical Modelling in Biology and Medicine Workshop, NSW, Australia
2017   Society for Mathematical Biology Annual Meeting, Utah, USA
2017   53rd ANZIAM Conference, SA, Australia
2016   University of Wollongong's 2nd Mathematical Modelling in Biology and Medicine Workshop, NSW, Australia

TEACHING EXPERIENCE

University of Sydney

Differential Calculus (Semester 1, 2016 to 2017)
Integral Calculus and Modelling (Semester 1, 2016)
Applications of Calculus (Semester 1, 2017 to 2018)
Optimization and Financial Mathematics (Semester 2, 2017)
Calculus of One Variable (Semester 1, 2018 to 2020; Semester 2, 2020)
Mathematical Modelling (Semester 2, 2018 and 2020)
Nonlinear ODEs with Applications (Semester 1, 2019 to 2020)

University of Technology Sydney

Arguments, Evidence, and Intuition (Semester 2, 2019 to 2020)